REMARKS/ARGUMENTS

Claim 1, 6, 7, 12 and 28-36 are pending in the case. Claim 1 has been amended to more particularly claim Applicant's invention. Support for solid particles can be found in original claim 2. Support for the claim language wherein the interstitial polymer network is covalently attached to the particles and forms an integrated continuous network in the interstitial space can be found at page 3, lines 16-18, page 4, lines 1-2, page 4, line 24 through page 5, line 3. Support for the requirement that the interstitial polymer network is permeable to fluid can be found at page 15, lines 7-20. Support for the new claims 29-34 can be found in original claims 9-12, page 26, line 6 through page 28, line 3, page 9, lines 7-8 and page 10, lines 11-12. Support for claims 35 and 36 can be found at page 14, lines 15-18.

Claims 1, 6, 7, 12 and 26-28 stand rejected under 35 U.S.C. § 103 as being obvious over either Good (U.S. Pat. No. 3,808,125) or Fuller (U.S. Pat. No. 3,878,092) in view of various secondary references depending upon which claim stands rejected. According to the Examiner, Fuller or Good disclose the claimed matrix while some of the secondary references disclose functional groups. However, neither of the primary references disclose or suggest the structure of the claimed matrix as presently claimed and therefore cannot render the claimed invention unpatentable.

Each of Fuller and Good disclose a cross-linked polymer bonded to discrete particulate packing material either directly or via a coupling agent. However, in each instance, the partitioning agent is a uniform film surrounding the particles. As stated in Fuller, at column 3, lines 53-60.

> Thus, the present invention provides chromatographic columns having, as a stationary phase or partitioning agent, <u>continuous discrete cross-linked polymeric material of an essentially uniform finite thickness</u> intricately bonded chemically through valence bonds to the interior wall or surface of the column and/or other support material, when used. *[Emphasis added.]*

Similarly, Good discloses at column 3, lines 44-47,

> The present invention provides a chromatographic column having a stable, uniform film of a polymeric stationary phase chemically bonded to the column and/or support material when used; . . . *[Emphasis added.]*

These disclosures are entirely consistent with Figures 3, 4, 5 and 6 in each of Fuller and Good which disclose a partitioning agent 24 which is attached to the packing material 23 by chemical means. Although not specifically described, 30 constitutes the interstitial space that remains after polymerization.

Although Fuller and Good discuss the use of packing material 23, the working examples do not utilize discrete particulate packing material but rather utilize stainless steel tubing. In each case, the polymerizable material is passed through the column as a plug under pressurized helium. This results in the covalent attachment of the partitioning agent to the wall of the chromatographic column. An axially extended opening 15 is used to pass fluid through the tubing. See, *e.g.*, Figs. 1 and 2 in each of Fuller and Good.

The claims as amended call for the formation of an interstitial polymer network in the interstitial space between and covalently bound to the solid particles. This can be seen graphically by reference to Figure 1 of the instant application wherein the interstitial polymer network at the far right is shown to be within the interstitial space defined by the solid particles. This is distinctly different from the thin film coated on particles disclosed in Good and Fuller. As stated at page 13, lines 24-28 of the application,

> As used herein, the term IPN refers to a polymer network which comprises a network of organic or inorganic polymer chains which in some embodiments contain cross-linking molecules to form a porous polymeric web within the interstitial space of a matrix. *[Emphasis added.]*

As stated at page 3, lines 24, through page 4, line 5,

> The IPN is effectively a large pore polymer contained within the interstitial space of the matrix. While not being bound by theory, it is believed that the IPN has properties of both a solid and a solute in solution. For example, the IPN generally is immobile, being bound to a solid surface. Yet, the IPN acts as if it is a solute. The IPN provides minimal flow resistance to solutions passing through the matrix via the interstitial spaces. In addition, the interstitial polymer network provides enhanced kinetic interaction between the polymer network and solutes contained in a solution. The combination of these two properties allows for the high throughput of solutions through the matrix without substantial loss of kinetic reactivity with solutes contained therein.

Independent claim 1 has been amended to state that the interstitial polymer network is permeable to fluid.

New claims 35 and 36 call for pores within the interstitial polymer network comprising at least one dimension of at least 100 or 500 nanometers. In general, such pore size is produced by using relatively high molecular weight monomers and/or cross-linking monomers in the synthesis of the claimed matrix.

By way of contrast, Fuller and Good use low molecular weight monomers which result in a thin film of relatively low porosity as compared to the claimed invention. The concentration of the vinyl stearate monomer in Good's partitioning agent solution, page 12, lines 11-15, is 25% (w/v). The concentration of the dimethyl diethoxysilane monomer in the partitioning agent solution of Example 2, page 12, lines 51-54, is 50%. This corresponds to a 3.37 molar concentration of the monomer in the partitioning agent solution. Fuller, page 11, lines 63-68, uses 25% (w/w, 1.9 molar) divinylbenzene crosslinker plus 25% (w/w, 2.4 molar) styrene monomer for the partitioning agent solution. When solutions with these concentrations of monomers and crosslinkers are polymerized, they form a solid polymer that is impermeable to fluid flow through the material. Both Good and Fuller prepare the columns by injecting a plug of partitioning agent solution into the columns, flushing with helium to ensure fluid flow through the void volume of the column, and then polymerize. In contrast, the instant specification describes the polymerization of dilute solutions of monomers and crosslinkers in the interstitial

space to form the interstitial polymer network. There is no flushing of the reagents with a gas or liquid flow prior to polymerization. Rather, the solution of monomer and crosslinker is polymerized in the interstitial space between the support surfaces to form the interstitial polymer network. Indeed, Applicant has found that too high a concentration of monomers results in a matrix which is plugged and impermeable to solution flow.

Given these structural differences and the unique flow and kinetic properties of the claimed matrix, it is submitted that neither Good nor Fuller disclose or suggest the claimed matrix regardless of whether a functional group is attached thereto or not.

The claims as amended are therefore patentably distinct over the art of record and the claims should be allowed to pass to issuance.

The Assistant Commissioner is hereby authorized to charge any additional fees, including extension fees, or credit any overpayment to Deposit Account No. 50-2319 (Our Order No. A-69071-1/RFT/469190-19).

Respectfully submitted,

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Dated: June 24, 2004

By: ______________________

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Filed Under 37 C.F.R.§ 1.34(a)

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